

### In the Claims

### Current Status of Claims

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1 100.(previously presented) A laminate comprising a monofilm-formed or multifilm-formed  
2 ply A, and another monofilm-formed or multifilm-formed ply B, both mainly comprising  
3 orientable thermoplastic polymer material, in which A has a fluted configuration and B on a first  
4 side is adhesive bonded in bonding zones to the crests on a first side of A,  
5 where:

6 (a) B also has a fluted configuration, the flute direction of B forming an angle from  
7 generally about 30 up to and including 90 to the flute direction of A and the said bonding zones  
8 being on the crests of the first side of B to produce spot bonding with the crests on the first side  
9 of A,

10 (b) the adhesive bonding is

11 (i) directly A to B and established through a lamination layer on A and/or B;

12 (ii) established through a separate thin bonding film ; or

13 (iii) through a fibrous web adapted for bonding, and

14 (c) the wavelengths of the flutes in A and/or B are no longer than 5 mm, and the  
15 wavelengths of the flutes in both A and B are less than 10 mm.

1 101.(previously presented) The laminate according to claim 100, wherein either the thickness  
2 of each of the said plies is generally the same in bonded and unbonded zones, or at least one of

the plies exhibits first solid-state- attenuated zones extending parallel to the flute direction, each bonding zone mainly being located within such a first attenuated zone whereby each first attenuated zone is understood as delimited by the positions where the thickness is an average between the minimum thickness of this ply within the first attenuated zone and the ply's maximum thickness within the adjacent non-bonded zone.

**102.(previously presented)** The laminate according to claim 100, wherein the flute wavelength in each of the two plies is no more than 4 mm, preferably no more than 3 mm and still more preferably no more than 2 mm.

**103.(previously presented)** The laminate according to claim 100, wherein each of the two plies the curved length of a flute is on average at least 5% and preferably at least 10% longer than the linear wavelength, the curved length being understood as the length of a curve through the cross section of a full flute wave including the bonding zone which curve lies in the middle between the two surfaces of the ply.

**104.(previously presented)** The laminate according to claim 103, wherein at least one of said plies the said average is at least 15%.

**105.(previously presented)** The laminate according to claim 103, wherein the width of each bonding zone in at least one of the two plies is no less than 15%, preferably no less than 20%, and still more preferably no less than 30% of the flute wavelength.

**106.(previously presented)** The laminate according to claim 100, wherein the flutes in at least one of the two plies are evenly formed and extend in a generally rectilinear shape.

**107.(previously presented)** The laminate according to claim 100, wherein the flutes in at least one of the two plies while extending mainly along one direction, are curved or zig-zagging and/or branched.

**108.(previously presented)** The laminate according to claim 100, wherein the flutes in at least

2 one of the two plies while extending mainly along one direction are differently shaped in a  
3 pattern which gives a visual effect showing a name, text, logo or similar.

1 109.(previously presented) The laminate according to claim 100, wherein at least one of the  
2 two plies has a metallic or iridescent gloss, or the two plies have different colours.

1 110.(previously presented) The laminate according to claim 100, wherein the main direction in  
2 which the flutes of A extend is generally substantially perpendicular to the main direction in  
3 which the flutes of B extend.

1 111.(previously presented) The laminate according to claim 110, wherein one of the said two  
2 directions essentially coincide with the machine direction of the lamination.

1 112.(previously presented) The laminate according to claim 100, wherein A, outside its first  
2 attenuated zones if such zones are present, is molecularly oriented mainly in a direction parallel  
3 to the direction of its flutes or in a direction close to the latter as determined by shrinkage tests.

1 113.(previously presented) The laminate according to claim 112, wherein B also is  
2 molecularly oriented and B's orientation outside its first attenuated zones if such zones are  
3 present is higher than A's average orientation in the same direction outside its first attenuated  
4 zones if such zones are present, the said two orientations being observable by shrinkage tests.

1 114.(previously presented) The laminate according to claim 112, wherein the yield tension in  
2 A in a direction parallel with its flutes and/or the yield tension in B in a direction parallel with its  
3 flutes, both referring to the cross- section of the respective ply and determined in non-bonded  
4 narrow strips at an extension velocity of 500%min-1, is no less than 30 MPa, preferably no less  
5 than 50 MPa and still more preferably no less than 75 MPa.

1 115.(previously presented) The laminate according to claim 100, wherein B has a lower  
2 coefficient of elasticity than A, both as measured in the direction perpendicular to the flute  
3 direction of A.

1 116.(previously presented) The laminate according to claim 112, wherein the choice of  
2 material for B and of depth of A's fluting is such that by stretching of the laminate perpendicular  
3 to the direction of A's fluting up to the point where A's waving has disappeared, B still has not  
4 undergone any significant plastic deformation, preferably B comprises a thermoplastic elastomer.

1 117.(previously presented) The laminate according to claim 112, wherein B, outside its first  
2 attenuated zones if such zones are present, has a main direction of molecular orientation parallel  
3 to the direction of the flutes or in a direction close to the latter as provable by shrinkage tests.

1 118.(previously presented) The laminate according to claim 112, wherein A is composed of  
2 several films, and the said main direction of molecular orientation, is the resultant of different  
3 monoaxial or biaxial orientations in the said films optionally mutually differently directed.

1 119.(previously presented) The laminate according to claim 117, wherein B is composed of  
2 several films, and the said main direction of orientation is the resultant of different monoaxial or  
3 biaxial orientations in the said films optionally mutually differently directed.

1 120.(previously presented) The laminate according to claim 100, wherein the first attenuated  
2 zones are present in at least one of the two plies wherein if such zones of attenuated ply extend in  
3 their transverse direction beyond the corresponding zones of bonding into non- bonded zones of  
4 the ply, the extensions within each non-bonded zone are limited to a total width which leaves  
5 more than half of and preferably no less than 70% of the width of the non-bonded zone as not  
6 belonging to any first attenuated zone, these widths being the distances measured along the  
7 curved surfaces.

1 121.(previously presented) The laminate according to claim 100, wherein the first attenuated  
2 zones are present in at least one of the plies and in which the bonding zones are generally  
3 coincident with the first attenuated zones.

1 122.(previously presented) The laminate according to claim 100, wherein the first attenuated

2 zones are present at least in one of the two plies. characterised by a second solid-state-attenuated  
3 zone between each pair of adjacent first attenuated zones, said second attenuated zones being  
4 narrower than said first attenuated zones and located on the non-bonded crests of the respectively  
5 ply.

1 123.(previously presented) The laminate according to claim 100, wherein at least one of the  
2 two plies exhibits solid-state-attenuated zones wherein the first attenuated zones of the ply are  
3 attenuated so that the minimum thickness in such zone is less than 75% of the maximum  
4 thickness of the ply in the non-bonded zone, preferably less than 50% and more preferably less  
5 than 30% of that maximum thickness.

1 124.(previously presented) The laminate according to claim 100, wherein A and B consist of  
2 material which is orientable at room temperature, preferably they mainly consist of polyolefin.

1 125.(previously presented) The laminate according to claim 100, wherein the spot-bonding  
2 between plies A and B is effected through a lower melting surface layer on at least one of the  
3 plies, formed in a coextrusion process.

1 126.(previously presented) The laminate according to claim 100, wherein at least one of the  
2 plies comprises a barrier film designed for protection against oxygen or other gaseous materials.

1 127.(previously presented) The laminate according to claim 100, wherein at least some of the  
2 flutes in one or both plies are flattened at intervals and preferably bonded across each ones entire  
3 width at the flattened locations to make the two arrays of flutes form closed pockets.

1 128.(previously presented) The laminate according to claim 127, wherein the flattened  
2 portions of a number of mutually adjacent flutes or of all flutes are in array.

1 129.(previously presented) The laminate according to any of claim 100, wherein by the choice  
2 of polymer material or by an incorporated filler or by orientation, the coefficient of elasticity E in  
3 at least one of the plies, measured in the unbonded zone of the ply in the direction parallel to the

4 flute, as an average over the unbonded zone is no less than 700 MPa, and preferably no less than  
5 1000 MPa.

1 130.(previously presented) The laminate according to claim 100, wherein at least some of the  
2 channels formed by the flutes in A and B, which channels may be closed to pockets, contain a  
3 filling material in particulate, fibrous, filament or liquid form.

1 131.(previously presented) The laminate according to claim 130, wherein said material is a  
2 preservative for goods intended to become packed in or protected by the laminate, preferably an  
3 oxygen scavenger or ethylene scavenger, a biocide, such as a fungicide or bactericide, a corrosion  
4 inhibitor or a fire extinguishing agent, optionally with micro-perforations established in the flutes  
5 to enhance the effect of said preservative.

1 132.(previously presented) The laminate according to claim 100, wherein both A and B are  
2 supplied with a multitude of perforations, whereby the perforations do not reach into the bonded  
3 spots, and the perforations in A are displaced from the perforations in B so as to cause gas or  
4 liquid when passing through the laminate, to run a distance through the flutes generally parallel  
5 to the main surfaces of the laminate ; the channels formed by the flutes may be closed to form  
6 pockets.

1 133.(previously presented) The laminate according to claim 132, wherein the channels or  
2 pockets contain filling material adapted to act as a filter material by holding back suspended  
3 particles from a fluid passing through the channels or pockets or is an absorbent or ion-exchanger  
4 capable of absorbing or ion-exchanging matter dissolved in such fluid, said filler optionally being  
5 fibre-formed or yarn-formed.

1 134.(previously presented) The laminate according to claim 133, wherein by choice of  
2 hydrophobic properties of at least the inner surfaces of the channels or pockets formed by the  
3 flutes and by selected small spacing of said channels or pockets, and choice of the distances  
4 between the mutually displaced perforations in A and B, there is achieved a desirable balance  
5 between the pressure needed to allow water through the laminate and the laminate's capability to





- 13 separate thin bonding film ; or iii) established through a fibrous web adapted to the bonding; and  
14 c) the wavelengths of the flutes in both plies are no longer than 10 mm, and the wavelengths of  
15 the flutes in at least one of the plies are no longer than 5 mm.

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- 1 173.(previously presented) A laminating apparatus comprising a grooved roller for fluting a  
2 first ply of thermoplastic polymer material, a grooved roller for fluting a second ply of  
3 thermoplastic polymer material, means for directing the first and second plies from their  
4 respective grooved rollers to a laminating station with the plies arranged in face to face contact

5 with one another and with the flutes of the first ply generally directed at an angle to the flutes of  
6 the second ply, the laminating station comprising grooved laminating rollers which apply heat  
7 and pressure between the plies to bond the plies together at the crests of the flutes of the second  
8 ply to form a laminate, the grooved fluting rollers and the grooved laminating rollers having  
9 groove pitches such that in the laminate the plies each have flutes of wavelength less than 10 mm  
10 and the flutes of at least one of the plies have a wavelength no longer than 5 mm.

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